

EXPERIMENTAL MUSICAL INSTRUMENTS

FOR THE DESIGN, CONSTRUCTION AND
ENJOYMENT OF NEW SOUND SOURCES



With this issue Experimental Musical Instruments completes its first year of publication. All in all, we can say without hesitation, it has been a promising year.

Regular readers will remember discussions in the last two issues on the tunability of tongue drums (an interesting letter on the subject appears in this issue as well). I had an opportunity recently to play a tuned drum built by Michael Thiele, one of the people who had defended their tunability. The drum was indeed beautifully tuned, in both fundamental pitches and overtone content. The timbre was the distilled essence slit drum sound -- light and bubbly yet full and rich, percussive but free of extraneous noise.

In this issue, along with our usual fare, we have two extended pieces: a pictorial study of Susan Rawcliffe's odd and exotic earthenware flutes, and, beginning at right on this page, a good look at Nazim Ozel's beautiful Semi-Civilized Tree.

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THE SEMI-CIVILIZED TREE

Designed and built by Nazim Ozel

Last October EMI printed a review of a concert performed by Nazim Ozel on his creation, the Semi-Civilized Tree. This extraordinary instrument seemed to merit more extensive treatment than we were able to give it in that forum, so in the following article we present a more complete picture of the instrument and its maker.

ORIGINS

Walking in a Colorado woodland area several years ago, Nazim Ozel came across a fallen evergreen tree. On the spur of the moment, he used some fishing line he had with him to run strings from dry branch to dry branch, in various orientations, all along the tree, and, in an impromptu performance attended only by himself and his walking companion, gave a quiet woodland concert on the long stretched strings.

For a long time after that Ozel carried about in his head the notion of a stringed instrument based on the natural form of a tree. The idea went through some evolution. At one time a prototype using driftwood was made; later a small section of a dry evergreen trunk with several protruding branches was used. Eventually Ozel decided to make the instrument from one carefully-selected, well-shaped branch or system of branches from a larger tree, and he began looking around for a promising candidate for the job.

It took some searching to find the right tree with the right branch. Ozel had decided early on to work with oak, and that live oak growing in a drier inland area was best. Eventually he settled on a particular system of branches -- a main branch leading to four or five secondary branches in turn leading to their sub-branches -- on a tree growing near Palo Alto, California. He performed the necessary surgery, brought the piece home and set to work.

LETTERS

I am enjoying your new publication. It seems to be developing as an effective outlet for various creative oddballs, and thus providing usable techniques and ideas for those who like this stuff. Your seemingly impartial interest in all kinds of new or relatively unknown musical noise-makers is refreshing.

I was inspired to send the enclosed photo by your coverage of the bi-level guitar. While that instrument's innovations are primarily timbral, my intention was to expand the orchestral possibilities of the "6-string", both for solo and ensemble, and to perhaps render it more "saxophone-like", that being the most agile of western melody instruments. So after my pondering it for years, the design was finally made by a local luthier.

It is simply an 8-string instrument, with no doublings of strings and all strings on the playing plane, with full cutaway access to the 24th fret. The middle six strings are intended as a "conventional" guitar; the outer two to higher and lower A's. High A is probably essential to a "standard" high 7-string tuning, but the low string is of course effective at A, B, C, D, or whatever. In the Big A tuning the guitar's range is of course: and it places 3 octaves "under the hand" at any one point as opposed to the 6-string's two. Voicings on the upper strings offer the chance for additional useful harmonic combinations involving the oddball major 3rd, which makes the big EMI chord of standard tuning best for triadic harmony.

Surely someone has done this before, but the only guitar music I can remember hearing that systematically added the high A is Lenny Breau's, shortly before his recent death.

Anyway, I hope you got a little kick out of this.

I've daydreamed of trying to patent it, but I know absolutely nothing about accomplishing it.

Thanks for your good efforts and keep it up.

Tom Baker



cerpt some of it below. Meanwhile, stay tuned for the full article to appear in a coming issue.]

...I don't know about bamboo, but we will send gourd seed to anyone who sends a large, stamped, self addressed envelope. We also have access to unfinished drum shell scraps from a drum company here. They are wonderful little round shapes and we use them for all sorts of things. We could keep our eye out for a certain size for someone. All of this stuff is pretty low volume and we just want to share a possible source with you.

Joe Cochran
1605 Greenwyche Rd.
Huntsville, AL 35801

I just received the 5th issue of EMI. Congratulations and thanks.

-- Hopkinophone: You must have had a lot of fun (and impatience). Brass tubing with thin walls sounds better than red copper. Aluminum alloy as well. Aluminum bars (not tubing) sound fine.

EXPERIMENTAL MUSICAL INSTRUMENTS
A Newsletter for the Design, Construction
and Enjoyment of New Sound Sources

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Subscribers can place relevant classified ads of up to 40 words without charge, and they will receive a 15% discount on display ads.

SUBMISSIONS: We welcome submissions of articles relating to new instruments. Articles about one's own work are especially appropriate. A query letter or phone call are suggested before sending articles. Include a return envelope with submissions.

[From the editor: EMI has been planning an article on gourds and bamboo in instrument construction, and among the people we spoke to in information-gathering were Lin & Joe Cochran. Joe's response contained additional useful information, so we ex-

What alloys? Try and err. The ones with copper are good. Some without are excellent.

F. Baschet

[The above notes are excerpted from two letters. Hopkinophone refers to the Disorderly Tumbling Forth, described in EMI #5.]

I just received your Issue #5, Vol 1, and I'm quite pleased. Please keep up your work in this area, especially with your coverage of the "lesser-known traditional instruments," as you call them, from the various cultures of the world.

For your "Recent Articles in Other Periodicals" column, here is a copy of an article on bell resonances from the "Amateur Scientist" column in a recent Scientific American. [See page 16.]

One question: In your recent article on the Disorderly Tumbling Forth [EMI Vol. 1 #5], you said the tubes "produce an overtone an eleventh above the fundamental" (page 11, left column, middle of page). But you didn't say where on the tubes you drilled the holes for the strings to hang them.

The resonances of cylindrical tubes depend critically on where these holes are drilled. For example, you will get a clean fundamental with few overtones if you drill the holes one-eighth of the way down the tube (starting from the top). You get the cleanest fundamental if you support the tube from its exact center, but then the tube won't hang vertically upright.

In your drawing on page 11, it looks like the support holes are much closer to the ends of the tubes than one-eighth of the tubes' length. If this is really where your support holes are drilled, it's not surprising that you got troublesome overtones.

I'm sure this has all been worked out theoretically under the heading of "physics of chimes," or some such, but I don't know of any references offhand. In any case, I've been trying out various industrial parts for use as chimes: round vs. square vs. I-beam channels, the effect of the tubes' or channels' wall thickness, and the effect of where the chime is supported. If I come up with anything worth reporting, I'll let you know.

Bob Flower

From the editor: Yes, do let us know -- it is a subject many people are interested in. Your observation is correct: the holes on the Disorderly Tumbling Forth are drilled, for the most part, at less than 1/8th the tube length.

I have comments on one of the articles in the Dec. '85 issue of your excellent publication.

The article about slit drums and boos reminded me of the slit drum I made a few years ago. My initial design had the destructive interference problem described in the article. My solution was to reinforce the fulcrum to which all of the tines were attached; this reduced communication between tines enough so I could tune each tine to the

desired frequency. The reinforcement was placed inside the slit drum to avoid any change in the appearance of the instrument. I have used the completed instrument to accompany our children's church choir.

The same principle is used in the African Mbira (thumb piano, Kalimba, Likembe, etc.). But in the Mbira, separate metal or wooden tines are attached to a rigid fulcrum (or bridge).

Daniel A. Driscoll, Ph.D.

P.S. I liked the article on Musical Instrument Classification Systems -- very instructive.

CORRECTION

In our last issue, in Christopher Banta's article, "Calculating Frequencies for Equal Tempered Scales," a portion of the section entitled "Non-Twelve" was repeated twice, with some information omitted in the first appearance. The complete text appears the second time. Our apologies to readers for possible confusion and to Mr. Banta for blemishing his fine article.

MUSIC FOR NEW INSTRUMENTS SOUGHT BY DISTRIBUTOR OF NEW AGE CASSETTE TAPES

Vital Body Marketing Co., Inc. distributes cas-settes of "beautiful, soothing, quietly inspiring music" throughout the U.S. Their catalog has emphasized music for instruments like celtic harp and psaltery, silver and bamboo flutes, synthesizers, and nature sounds, all in the relaxing, atmospheric style that has come to be known as new age music or space music. The tapes are packaged and displayed in an unusual manner, reminiscent of a high-quality paperback book. Distribution is through various types of outlets, not only record stores.

The people at Vital Body are planning to release a new line on cassette and CD, on the theme of space music and music of the future. They are currently looking for music for new and unusual instruments for possible inclusion in this series. Anyone producing appropriate music with new instruments -- music that is peaceful and relaxing -- is encouraged to be in touch. Contact Jeff Charno at Vital Body Marketing Co., Inc., 42 Orchard Street, Box 1067, Manhasset, N.Y. 11030.

INSTRUMENTS

THE SEMI-CIVILIZED TREE

(continued from page 1)

FORM AND CONSTRUCTION OF THE INSTRUMENT

The resulting instrument, now called the Semi-Civilized Tree, is made up of this system of branches, stripped of its bark and strung in all directions with over four hundred strings. It is just over five feet high, and with its baroque bends and twists, takes up a space about three or four feet in diameter. Ozel stands it with the smaller branches resting on the floor and supporting the rest above -- the opposite of the orientation of a small growing tree, but similar to the way this self-same branch hung from the larger tree in its natural state.

Ozel collects cast-off (but new) strings from music stores. They give him strings intended for all sorts of instruments; he tries them on the tree, keeps those that work well and discards the others. In general, nylon strings have not been as effective, as they lack sustain. Strings for classical guitar, as well as Oud and Saz (Middle Eastern plucked lutes), have all been used but are used no more. Among those that have found a permanent place on the instrument are harp, cello, violin, guitar, mandolin and banjo strings -- all made of steel or wound-over steel. The harp strings come in fifty-foot coils, and in many places the tree has a single continuous harp string divided into separate vibrating segments as it runs back and forth between two branches or round about between several different branches.

The strings are attached in several ways. Guitar machine pegs, singly and in sets of six, are affixed to the wood by screws. Harp tuning pins set in holes drilled in the wood are also used. At the ends opposite the tuning peg the strings pass through the branches via holes that have been drilled, to be held in place by stoppers on the far side. Many either run through holes or over bridges formed by parts of the branch, to continue in another vibrating segment on the other side.

Variety of sound, rather than uniformity or predictability, is Ozel's aim. Accordingly, the vibrating lengths of the strings vary to extremes, from two inches or so to about three feet. The variety of string types makes for a diversity of diameters, and the diameter-to-length ratios also are inconsistent. Some strings are tightened to a point of brittle tautness, while others are loose enough that their

sounding pitch abruptly descends in the first moments after they are plucked hard. The rigidity of the branches supporting the strings also varies considerably. The result of all this, of course, is a great variety of timbres from the plucked strings.

Within this spectrum of string types and sounds, there are deliberate groupings. The form of the branch naturally gives rise to some clustering of the strings. Anywhere from four or five to forty or so are grouped together here and there in harp-like sets between pairs of conveniently spaced branches. Within these sets the strings are usually similar in material, tension, diameter and the like. They also may be uniform in lateral spacing, and have coherent relationships of graduated length.

The tree itself is not an effective acoustic resonator. The strings communicate their vibrations readily to the wood of the branches, but the branches do not in turn project much sound energy to the surrounding air, since they don't have much surface area. One result of this is that the strings have fairly long sustain, since their energy is not quickly dissipated. In a small quiet



room the sounds are lovely. When the instrument sits on a wooden floor, the floor can serve as a soundboard, amplifying the sounds a bit and providing an open spatial feeling. A liberal dose of sympathetic vibration in the strings not plucked enhances the effect. One can also place an ear directly against the wood as the instrument is being played to hear everything loud and clear.

For performance situations, Ozel uses a contact mike placed at a central point on the branch. It turns out that the vibrations of the strings are transmitted throughout the wood with remarkable uniformity: the mike picks up vibrations from all the strings with scarcely any bias in fidelity or volume, without distinction between strings attached near the pickup and those at the extremes of the farthest branches. The microphone make that Ozel uses is a Frap Flat Response Audio Pickup (made by Strobotronix, Inc, Box 40097, San Francisco, CA 94140), and it reproduces the sound quite satisfactorily.

The Semi-Civilized Tree is a special feat of (in Ozel's words) "improvisational engineering." Though oak is a strong and fairly rigid wood, the branches of the tree are narrow and delicate in places, and the spans of the strings between them quite long. There is a minimum of reinforcement between the branches (one metal support spanning between two of the branches is the only added structural piece). And four hundred strings create a great deal of cumulative tension. How does the tree support them all? The answer lies in the balancing of tensions.

Ozel has distributed the strings in such a way that wherever the pull of a given string or set of strings might draw a branch out of position and threaten to break it, other strings on the same branch create an opposite pull to offset the tension. Additionally, in many places the strings are oriented along the branch more or less longitudinally, in a configuration reminiscent of a many-stringed musical bow, avoiding a purely lateral pull which would flex the branch excessively.

The engineering is improvisational in the sense that one can never formulate solutions for string placement and apply them uniformly; one can only look at the idiosyncratic particulars of a particular set of branches-to-be-strung, consider their relation to the surrounding branches, and try to evolve string arrangements that work organically in the whole.

PLAYING TECHNIQUES

Ozel sounds the strings in a thousand ways, although we can only describe a few of them here. With the fingers of both hands and with guitar picks he plucks them and strums them. He strikes them with tiny metal sticks (actually drill bits), with lengths of bamboo a foot or so long, and with a larger wooden stick of about two feet.

He bows them with a traditional violin bow, and uses it col legno ("with the wood" of the bow) as well. Ozel's equivalent of sul ponticello, bowing at the very extreme end of the strings, readily generates multiphonics and extremely high harmonics.

He also bows the wood of some of the smaller branches. Naturally this excites the attached

strings a bit, but most of the resulting sound is the wood itself. The sound is a gentle wail, hoarse and rough but, for some branches at least, possessing an identifiable pitch.

Ozel has also experimented with clavichord-like techniques, striking the string with a bamboo stick and holding it firm on the string in the manner of the clavichord's tangent, exciting the segments of string on one or both sides of the stick. He sometimes does this in a quick back-and-forth motion between two adjacent strings, producing a tremolo involving four notes. Moving the stick along the string as one strikes repeatedly causes the pitch produced on one side of the tangent to descend as the other rises. Using the two-strings the tremolo technique produces a peculiar glissando of four-way contrary motion.

Another of Ozel's techniques involves lodging one end of the bamboo striker between two closely adjacent strings, so that the two hold it loosely in place. This arrangement creates a spring-like effect: the far end of the bamboo will swing back and forth like a pendulum (but horizontally) if someone gives it a start. Ozel places the bamboo so that its far end bounces repeatedly against a third string when it's given a little push. How far the bamboo swings away on each bounce, and correspondingly how long it is before the string strikes again, depends upon where in the sounding string's cycle it chances to hit. A more unpredictable system of time values could scarcely be devised. The result is a completely random rhythm in the sounding notes. The mechanism also happens to be fairly efficient in terms of self-perpetuation, with the swinging and striking continuing for up to half a minute or so while the player is free to work with other sounds.



The bamboo striker lodged between two strings.

Photo by Bart Hopkin

Ozel makes extensive use of bent tones and vibratos both wide and narrow. He produces the wavering by taking advantage of the flexibility of the branches, bending them slightly with one hand to vary the tension on the attached strings, as he plucks or bows with the other.

When playing with the bow, Ozel sometimes changes the strings' vibrating length by stopping them with the fingers of the non-bowing hand. Since there are no necks or fingerboards to speak of, he does this spike fiddle style, pressing the

finger firmly enough against the string in mid-air to allow it to sound clearly.

TUNING

How should one tune over four hundred strings that are oriented in all directions and have no orderly spatial layout? Ozel's response to this question is in keeping with the nature of the instrument. He allows several tuning arrangements to coexist within the instrument, some deliberate and some random, as they are suggested by the form of the tree itself.

Due to the shape of the branch, the strings naturally are arrayed in clusters (pairs of branches often form a natural harp-like shape). The spatial relationships between these separate clusters are varied and irregular. Ozel has allowed different clusters of strings to sound different facets of the instrument's personality. He tunes them to differing scales and pitch standards whose relationships to one another are, like the spatial relationships of the clusters, varied and irregular.

Nor has he codified the tunings -- with each tuning session he continues to experiment. As a general rule, though, he sets some string groupings to untempered Turkish scales (Ozel, of all people, has the training and ear to tune these accurately). Some he sets to tempered Western scales. Inevitably, many are in effect random -- notably, those clusters which, if their tuning were manipulated, would pull other previously tuned clusters out of whack. This happens when changes in the stresses on a particular branch resulting from the tuning of one set of strings alter the tensions on other strings affixed to the same branch. Perhaps not surprisingly, the random clusters often seem to provide some of the most ravishing sounds, as Ozel would be the first to say.

The result of this fortuitous mix of scales and pitch standards is an instrument which might not do an effective job on a Liszt piano concerto. What the tree does do is to provide us, by the twists and turns of its branches, with windows on an array of varied but equally-valid musical realities. Here are strange and beautiful colors and sounds, unexpected melodic turns, peculiar and alluring harmonic shifts, all deriving from the meeting of the branch, in its unchangeable idiosyncrasies, with Ozel's open aesthetic personality.

IN PERFORMANCE

A review of a concert performance on the Semi-Civilized Tree appeared in EMI Vol I #3, October 1985. That performance was made up of a straightforward presentation of the music of the Tree -- an hour-long excursion through its changing colors and textures and moods. By contrast, some of Ozel's performances have been very different affairs, as stimulating for the concepts underlying the form as for the music presented. One of these was "Holes of Perception", a 1985 performance presented at Mills College in Oakland. At the start the audience saw the Semi-Civilized Tree standing alone on an almost empty stage, against a

backdrop of unblemished white canvas. But at the foot of the canvas stood a row of paint cans and brushes, all clean and ready and inviting looking. Enter Ozel. He first began playing, then moved to painting, splashing colors and shapes on the canvas and surroundings between flurries of notes on the Tree. As he painted, ringing sounds unexpectedly began to arise: 260 bells and a number of metal pipes had been suspended up against the opposite side of the canvas, and jangled with each brush stroke. Some time into the performance, Ozel abruptly turned from the Tree to puncture the canvas with the bow. From the far side this time came more string sounds. Using a utility knife, Ozel went on to make more exploratory slices in the canvas. As a small section of it fell open, the audience partially glimpsed for the first time more stretched strings, mounted somehow behind. The performance proceeded with more music, more painting and more slicing, and with the canvas falling away bit by bit to reveal progressively more of what turned out to be a huge string installation. Through the remainder of the performance Ozel moved in and out, stepping through holes in the canvas to play the half-hidden installation, then returning to the front to sound the Tree, painting and slicing all the while to create, through the cumulative effect of countless seemingly unpremeditated actions, an environment of pigment and pitches and melody; tatters, scraps and sculpture.

FUTURE POSSIBILITIES

The Semi-Civilized Tree is one of a kind and will remain so, since an identical branch could never be found. But it is tempting to think that, different as they may be in specific form and arrangement, other instruments could be made along the same lines -- that is, other trees could be semi-civilized. Ozel says that, due to the unpredictable nature of the project and the huge amount of individual labor that would go into the creation of another Semi-Civilized Tree, they could not be made in quantity, and would be difficult to make on commission. Nonetheless, he says, he learned a great deal in making the first one, and often thinks about creating another with the benefit of his now-greater knowledge. There are a number of developments he would like to incorporate into a new one. One of these is to use some of the branches as flutes. Ozel has found that by working with the wood still green, he can force crooked branches straight for long enough to drill them with a long bit, then allow them to spring back to their natural curvature, thus creating a cylindrical bore through the length of the bent branches. Tone holes could then be drilled through the side of the branch. Or, more dramatically, they could be drilled longitudinally through smaller branches growing from the main bored branch, cut to within a couple of inches of the branch. Working examples of this strange arrangement have already been made.

With these thoughts in mind, Ozel is again looking for potentially useful branches as he walks among the oak trees.

SOME BACKGROUND ON NAZIM OZEL

Nazim Ozel, creator of the Semi-Civilized Tree, was born in Turkey. He grew up in a tiny, isolated village untouched by modern advances. As a young man he attended art school in Istanbul. His subsequent professional work in Turkey included commissions for bas relief, mosaics, frescos and the like, among them some works on a grand scale. At the same time he studied Ney, a Middle Eastern end-blown flute, with Aka Gunduz, considered before his death to be one of the leading practitioners of the instrument. After some time in Europe, Ozel came to the University of Wisconsin in 1976 for a Master of Fine Arts degree and some teaching. He has remained in the U.S. since then, and continued with both visual arts and music. Increasingly he has moved into performance art and instrument building/sound sculpture.

A bit more here about the Ney flute: it is one of the primary instruments of Turkish classical music; an instrument of great antiquity, going back some 6000 years in its present form, and possessing an imposing tradition. It is made of bamboo, with seven tone holes, and, in Turkey alone, an unusual mouthpiece of water buffalo horn circling the entire opening. By Western standards the music is very microtonal, employing over seventy recognized pitches per octave used in over a hundred recognized modes. These differentiations are achieved in a seven-holed instrument by means of highly-refined half-holing technique, fine control of embouchure and air-stream direction, and a well-developed ear. Ozel has continued to perform on the Ney in the U.S., and builds them as well.

With its formal tradition and high-culture associations the flute is the very opposite of Ozel's Tree. The Tree has no tradition and lends itself to personalized and generally unruly, non-conformist styles of expression. Ozel comments that the two elements counterbalance one another in his musical life. In many respects it seems a long journey from an isolated Turkish village to the avant-garde side of the Western art world; somehow, between the Ney flute and the Semi-Civilized Tree, the distance is spanned in Ozel's work and in his person.

When he talks about his activities in his several chosen media -- painting, sculpture, traditional music, new music as represented by the Semi-Civilized Tree, and mixes of these -- Ozel is always eager to communicate a single aesthetic sense underlying all the work. As an artist he is concerned with how we perceive and interact with the world of objects, man-made and natural, which exist around us. It is these same objects which provide the raw material for his works. In most of the world's recent technological development, working materials have tended to be reduced to some sort of building-block unit or fundamental substance, so that more complex forms can be built up or synthesized from there. Ozel, by contrast, likes to work with forms already existent in the world. He bends them, alters them, juxtaposes them according to his aesthetic purposes, helping us to see them with new eyes -- but in a manner that retains some of the spirit and remains respectful



Photo by Bart Hopkin

The Semi-Civilized Tree: Detail showing some of the tuning mechanisms.

of the original, natural form. This orientation, he says, reflects his early origins. The Semi-Civilized Tree exemplifies Ozel's approach well, and the choice of a name for the instrument reflects his thinking on this subject: on one hand there are trees as they exist in nature prior to human interference; at another extreme is the wood which has been "civilized" -- made to conform to standards unrelated to its natural form, by running it through a lumber mill, squaring it off, standardizing its dimensions. Ozel accepts the branch's form and works within it, but bends it to his purposes, "semi-civilizing" it.

The result is an instrument which is of necessity unique and individual; it cannot be mass-produced, and if it breaks it is irreplaceable.

FOR MORE INFORMATION...

Recordings of the Semi-Civilized Tree are now available. The tape is taken from a live performance, and constitutes an expansive exposition of the personality of the instrument. It costs \$8, postage included, from Nazim Ozel, 2029 Oak St., San Francisco, CA, 94117; (415) 668-5077.

For more information on performances, commissions, or the Semi-Civilized Tree in general, Ozel may be contacted at the same address.

INSTRUMENTS

THE CERAMIC WHISTLES, FLUTES, OCARINAS AND MIRLITONS OF SUSAN RAWCLIFFE

Spread over the next few pages are photographs, drawings and descriptions of musical instruments created by Los Angeles maker Susan Rawcliffe. Rawcliffe makes fipple flutes of earthenware clay in every imaginable shape and form. Some are fairly conventional instruments, while others use new and unusual methods of exciting and controlling the sound. Still others use standard acoustical systems, but are exotic in shape and appearance. The inspiration for the instruments derives in part from Rawcliffe's research into pre-Columbian flutes -- a subject on which she has written and lectured widely. Some of her pieces are based upon the acoustical principles of pre-Columbian types, and many use scales derived from the original instruments. Other scales Rawcliffe uses include 12-tone equal-tempered, various rational (i.e., just) scales and subharmonic scales, and plenty of freely experimental or simply random scales.

Rawcliffe has concertized with her instruments throughout California, and exhibited them in shows around the country. She gives lectures and workshops on both pre-Columbian instruments and contemporary clay music. Several composers have written for the instruments, and Barney Childs' "Clay Music," scored for them alone, has been recorded and released by Cold Blue Records (available from New Music Distribution Service, 500 Broadway, New York, NY, 10012). A more recent demo tape of the instruments is also available from Rawcliffe.

Upcoming performances include:

"Ancient Beasts," for didjeridu, tape and triple ocarina, at New Music America 1986 in Houston Texas, April 7-14 1986.

A solo concert at Experimental Intermedia Foundation in New York City, on May 9, 1986.

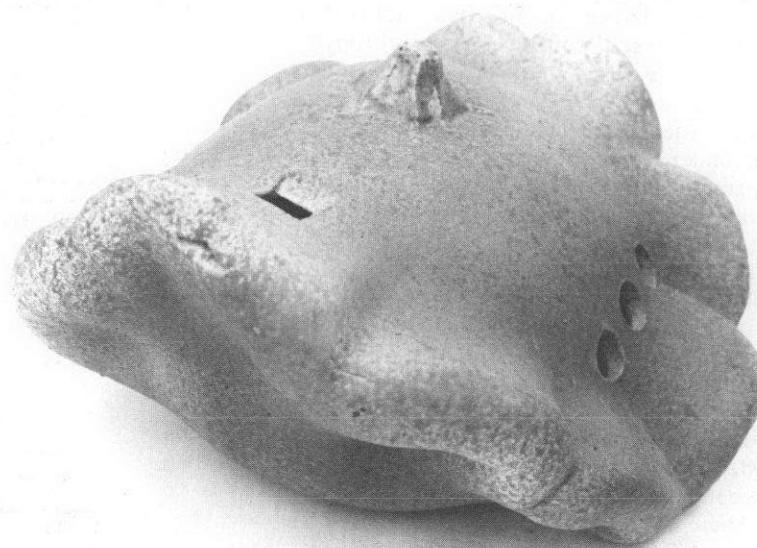
A lecture demonstration at the Metropolitan Museum, New York City, on May 13, 1986.

For more information on performances, lectures, workshops and instruments, contact Susan Rawcliffe at this address:

Susan Rawcliffe
2278 Allesandro
Los Angeles, CA 90039.

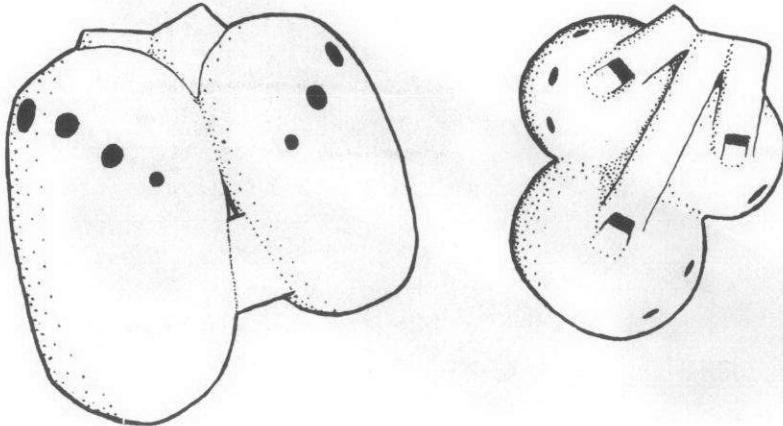
OTHER MAKERS OF UNUSUAL FLUTES

Along with Susan Rawcliffe, many others are currently involved in making beautiful and exotic ocarina-like instruments. Experimental Musical Instruments Vol I #2, August 1985, contained an article on the Sharon Rowell's ceramic multiple-chambered ocarinas, and a listing of several more makers accompanied that article.

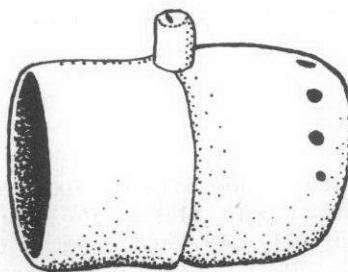


OCARINAS: Ocarinas are fipple flutes (i.e., flutes with recorder-style mouthpieces) with sounding chambers that are more or less globular rather than cylindrical. One of the wonderful things about globular flutes is that the maker has a lot of freedom, within certain limits, as regards the shape of the air chamber.

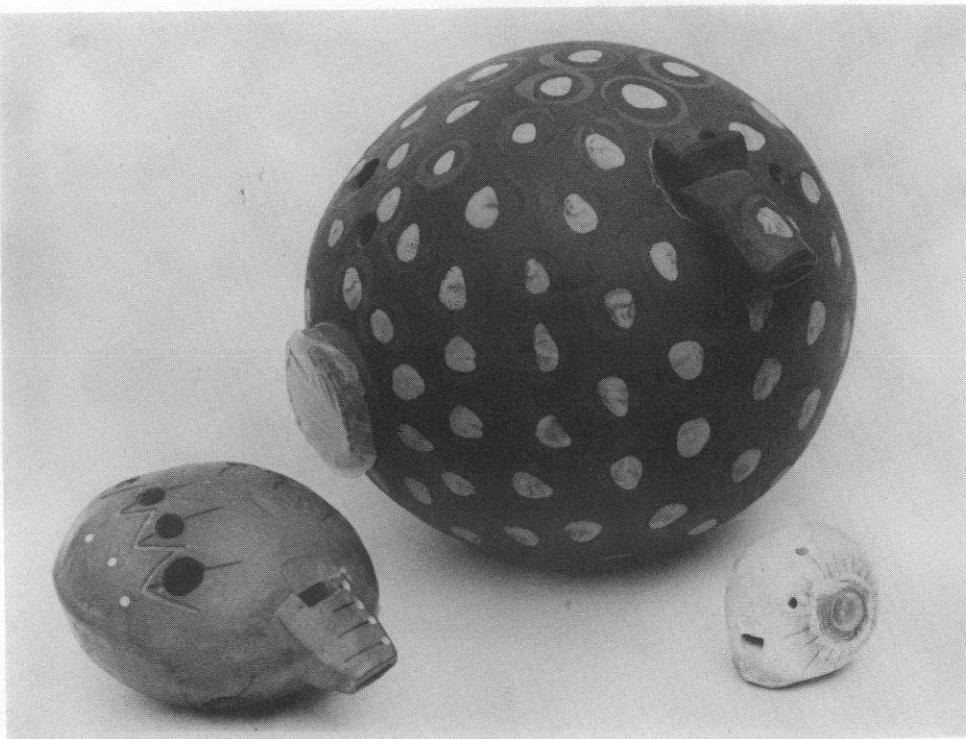
In the upper photograph on the facing page are tiny necklace ocarinas, only 1.5" to 3" in diameter but possessing a range of a chromatic ninth, with cross fingering. Below on the same page is one of Rawcliffe's middle-sized (8" diameter) vegetable-shaped instruments. The drawings below are multiple ocarinas -- ocarinas with more than one sounding chamber and, as a result, the ability to play two or more notes simultaneously.



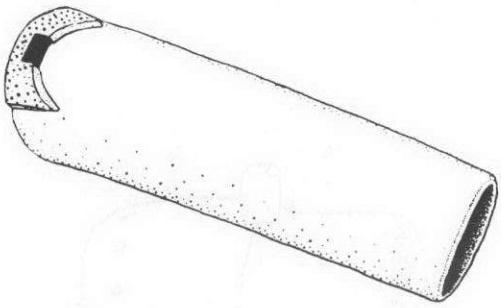
MIRLITON OCARINAS: The smallest and largest of the instruments shown at right are mirlitons. They have thin membranes of fish-skin stretched over holes in the sound chamber to add a characteristic buzz to the tone just as a kazoo adds a buzz to a human voice. The middle-sized one has the hole available for an optional membrane.



WHIFFLE OCARINAS: In the whiffle flute above, a single fipple and edge (not visible in the drawing) serves two separate sounding areas. The lower portion of the instrument is an enclosed chamber with tone holes, comparable to a regular ocarina. The upper part is an open chamber with a wide-diameter mouth, played much like the tuba-flute described above. The sounding edge is located in the wall between these two areas. Either chamber can sound, and the one which is not sounding can still affect the other. The factors governing these acoustic behaviors are subtle and complex, but they are manipulable; i.e., the player can bring them under control. The most striking effects can be created by "whiffling" -- rapidly shifting the primary vibration back and forth between the two chambers.



Photos on pages 8-11 by Susan Rawcliffe, except the bottom two on page 11 by Jim Grant. Drawings by Jose Garcia with Marsha Polekoff.



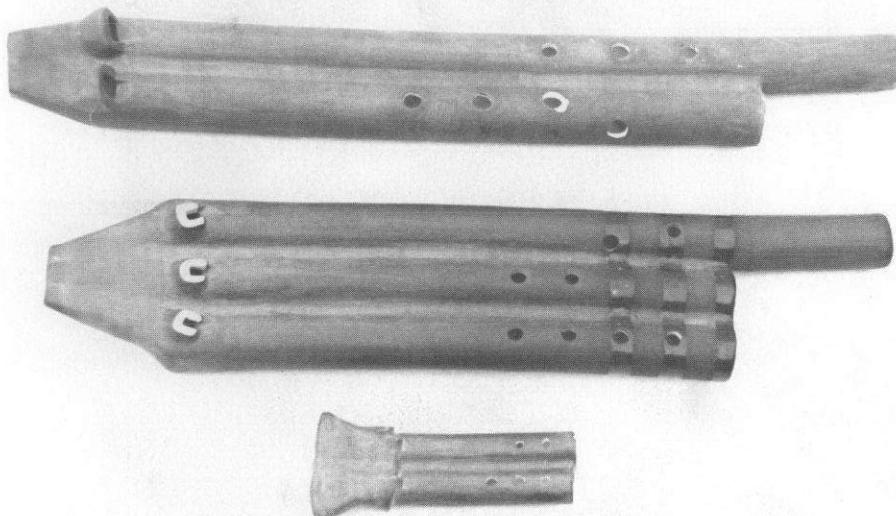
TUBA FLUTES: Rawcliffe's Tuba Flutes (above) are fipple flutes of large diameter (typically 3"), and lengths of approximately 7" to 12" (a few are much larger). They have no tone holes. The player controls the pitch by opening and closing the large open end with one hand. When it is completely closed the tube produces its lowest note. Gradually lifting the hand to produce a larger and larger opening produces a tone sliding upward over more than an octave. Some wild harmonics can be produced by nearly closing the opening and increasing wind pressure. The tuba flute, in the "right" hands, "qualifies as silly" (Rawcliffe's words); yet with practice accurate intonation is possible and an advanced technique can be developed.

WHISTLES: Rawcliffe's whistles come in variegated forms. Some have multiple chambers and many have one or two tone holes or other pitch-control devices. Her Y- or T-shaped Double Whistles have the mouthpiece in the middle. The two open ends can be stopped or partially stopped by rolling the thumbs over them to change the pitch and vary the timbre.

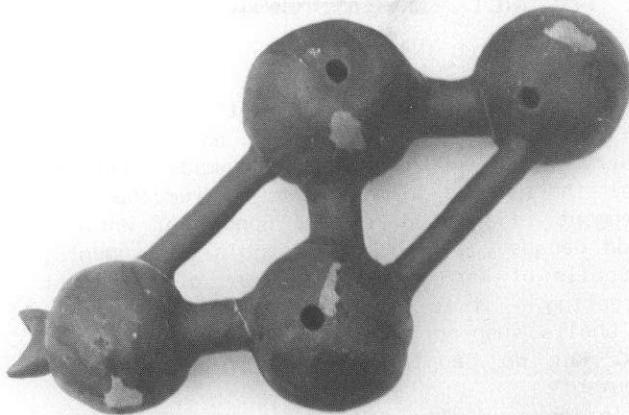
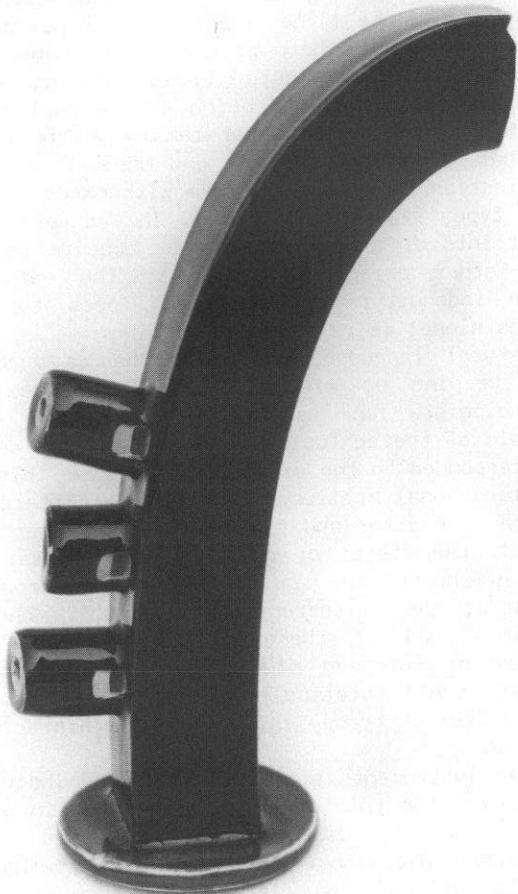
The "Space Whistles" (two of which appear at right above and below) are sculpted and glazed for a strong visual effect. The most elaborate ones use two or three sounding chambers with one tone hole each. They are pitched in the sensitive upper regions of the hearing range and designed to generate strong beats and combination and difference tones (especially potent for the player). Rawcliffe says "They are only for the strong hearted.... The effect is alien, and enchanting," and, again, "This is a very intense sound which some find overpowering."



PRE-COLUMBIAN INSTRUMENTS: Two acoustic studies of pre-Columbian flutes are shown at right: the goiter flute above is taken from a Mayan design. The howler monkey whistle below, which uses three acoustically-linked inner chambers, derives from an Olmec design.



PIPES AND FLUTES: Rawcliffe makes single, double and triple cylindrical fipple flutes, such as those shown at left, with various tunings and timbres. The timbre is manipulated by varying the diameter of the bore of the pipe, by varying the shape of the mouthpiece, or by adding a wall or hood around the mouthpiece. The pipes typically play into the second octave, with added usable harmonics. A double usually has a melody pipe and a 'chordal' pipe; a triple adds a drone.



ODD-BALLS: Two of the more oddly-shaped instruments appear above and below: the Crown Flute or Flute Mask (played by Rawcliffe in the photograph), and 4 Balls at the Crossroads. The bird-beak mouthpieces and tubes-and-spheres approach of the latter are derived from pre-Columbian models.



THE MELOPHONE, THE HARMONIPHONE, AND THE MELO-HARMONIPHONE

NAMES FOR INVENTED INSTRUMENTS

Several times I have run into this rather odd fact: people who know just enough about the work of Harry Partch to be aware that he made unconventional instruments always seem to remember one instrument in particular: The Spoils of War. It is odd because, of all of Partch's instruments, the Spoils of War is certainly one of the least interesting -- it is just a number of empty artillery shells suspended in a frame to function as bells. Why do people remember this particular instrument?

It's the name, I'm sure of it. "Spoils of War" is an irresistible name.

Finding a suitable name is perhaps one of the last things that many builders think of as they work through an acoustical idea. For people involved in creative instrument building, the compulsion to attach a name to something early on can seem at odds with the fluid nature of creative processes. But it is the nature of human language to organize the world into labelable categories. People expect to be able to think of musical instruments as members of discrete types with identifiable characteristics and regular linguistic handles. You build an instrument; someone will ask you what it's called.

And the name, I have found, makes a great deal of difference in people's response to any new instrument. There is something about being confronted with an uncategorizable type, and the way that this deprives people of their familiar modes of thought, that makes them need the label more. And somehow it makes them more responsive to the sound and the freshness of the name itself. For builders who would like to see their work garnering some recognition, their instruments making their way in the world at large, this is worth thinking about. If one can find a name that catches the imagination, doors will open; people will be interested. A magnificent instrument with a boring name, on the other hand, simply has one more obstacle to overcome.

But how difficult it is to come up with a convincing name!

Let's look for a moment at the way we think about musical instrument names. We use the term "musical instrument" in two distinct ways. In the sentence "hand me that musical instrument" it refers to a particular individual object. In the sentence "What musical instrument do you play?" it refers not to an individual, but to categories. The question could be rephrased as "What type of instrument do you play," and an answer such as "the bassoon" would refer not to an individual bassoon, but to instruments of the bassoon category. That category is defined by certain characteristics -- in this case, a double reed, cylindrical bore, keys arranged more or less in keeping with an established pattern, a standard approximate length and shape, etcetera. Less formally it is also defined by certain playing techniques, standard repertoire, and various familiar associations.

But musical instruments never have been as discretely categorizable as human language would make them, and in the larger organological perspective there have always been problems with names. Very few musical instruments (read "categories of instruments") come into being with a well-defined set of characteristics that remain static as long as that instrument is made and used. Despite our inclination to try to fix them with names, instrument types evolve continually. They develop, they split into different types, they acquire features from other categories. Such is the nature of human ingenuity: we just can't seem to leave things alone; we're always tinkering.

Natural language, meanwhile, has a murderous time keeping up with the evolving types, and organologists have a lot of headaches. As an example of the confusing manner in which language has responded to the situation, consider this list of traditional instrument names: the cittern, the citara, the sitar and the setar; the kithara, the kitiar, the kissar or guisarke; the guitar with its offshoots the guitarillo, guitarron and chitarra; the chitarrone, the gittern, and the guitarra. All of these refer to Indian, Near Eastern or European plucked string instruments, and all are theoretically discrete and identifiably different types, though perhaps historically related.

With instruments recently created by individual inventors, the role of natural language in generating names is usurped by individuals making deliberate decisions. The maker, or perhaps a promoter or publicist, is free to dream up a name for the instrument just as he dreamt up the design of the instrument. But the same confusion of very similar forms that occurs in natural language has occurred at times here as well. For example, in the nineteenth and earlier in the twentieth century, people seemed to feel a particular need to convey the harmoniousness and melodiousness of their musical devices. For instance, the world has seen at least three separate invented instruments called harmonicas (a mouth organ, musical glasses and a type of button accordion), as well as the harmonium, the harmonia, and the harmonicon; the harmonichord, the harmonicorde and the harmonicor; the harmoniphon and the harmoniphone; the harmonette, the harmonino, the harmomelo -- and the list could go on. (Most of these, in keeping with some unwritten law, were free reed instruments.) Then -- taking our cue from the harmomelo -- there were the melodikon, the melodian; the melodika and the more recent melodica; the mellophone, the melophone, the melodina, the melodore and, again more recently, the mellotron and the melochord -- all describing instruments of various types invented since the mid-nineteenth century.

The inventors of all these instruments could have given them any name in the world, or even declined to enter the name game. Yet in their choices they managed only to repeat themselves. It just helps demonstrate how easily the imagination fails us.

But lately many people seem to have been bringing a little more spirit to the task. I am full of admiration for those who succeed in coming up

(continued at right below)

BOOKS

SOUND/ART

Catalog of the Sound/Art exhibition, sponsored by the SoundArt Foundation, Inc. and curated by William Hellerman. The exhibition took place in May 1983 at The Sculpture Center and June 1983 at BACA/DCC Gallery, both in New York. Contributors include Vito Acconci, Connie Beckley, Bill & Mary Buchen, Nicolas Collins, Sari Dienes & Pauline Oliveros, Richard Dunlap, Terry Fox, William Hellerman, Jim Hobart, Richard Lerman, Les Levine, Joe Lewis, Tom Marioni, Jim Pomeroy, Alan Scarritt, Carolee Schneemann, Bonnie Sherk, Keith Sonnier, Norman Tuck, Hannah Wilke and Yom Gagatzi. Catalog essay by Don Goddard.

Available for \$5 from The SoundArt Foundation, Inc., 45 Greene St., New York, NY 10013.

The "Books" section of EMI's October 1985 issue ran a review of the very fine exhibition catalog from the Sonic Art show, a sound sculpture exhibition which took place in San Bernardino, CA, 1982, curated by Marlin Halverson. Accompanying the review were some comments on the special value of such catalogs in the field of new instruments and sound sculpture, and we promised then to try to let people know about other catalogs that are available, by occasionally devoting this column to them. We turn to the subject once again now, with a look at Sound/Art, the catalog from an exhibit of the same name which took place in New York in 1983.

The catalog consists of an introductory essay, followed by one page for each of the twenty-one artists or artist-duos (listed above) who appeared in the show. Each artist's page contains something written by the artist about his or her work, plus a black and white photograph or some other sort of graphic representation, plus brief biographical information.

The photographs, supplied by the artists, vary in quality, and some are neither aesthetically interesting nor visually clear and readable. Where graphics are supplied in place of photos they are not always informative either. Some of the photos and graphics, on the other hand, are attractive or intriguing, and a few do a good job of communicating information about the work represented.

The situation is similar with the artist's writings. Some contributors used their allotted space to give a straightforward description of their work, its underlying mechanics, and some of the thinking behind it. Others apparently had other purposes in mind, using their page to convey something about the spirit of their work and scarcely speaking about its physical form. A few of the writings are in mysterious or poetic language, with, superficially at least, little apparent relationship to the work at hand. There seems to be a strong disinclination among some artists (not only those represented here) to explain their work in any way -- which is, of course, a perfectly valid aesthetic, but frustrating for those of

us interested in how things work. We should remember, though, that many of these graphics and writings would undoubtedly become clearer in purpose if they were seen, as originally intended, in conjunction with the exhibit itself.

Many of the artists represented in the catalog are essentially visual artists who seek to enhance their work with sound which is not physically integral to the work itself, but is taped in advance. All questions of merit aside, the work of these people is less likely to be interesting to new instruments people.

Many of the remainder use primarily electronic sound-generating devices. But these works couldn't be farther from the predictability and orderliness associated with commercial electronic instruments. Jim Pomeroy's "Mantra of the Corporate Tautologies," for instance, is described as a "canonic arrangement of self-propelled electronic synthesizers keyed by combinations of protrusions inserted between the tracks of a circular plastic railroad." It utilizes, among its appropriated hardware, toy trains and tinkertoys. Richard Lerman's "Amplified Money" is exactly that -- bills of various denominations wired to serve as the diaphragms of functioning microphones, responding (in a highly biased manner) to ambient sounds in the room. Nicolas Collins' work is similar. His "Under the Sun" is a single stretched string, with pickups and amplifier, designed to (in catalog essayist Don Goddard's words) "play the world of sound rather than being played," by responding likewise to ambient vibrations.

Finally, there are some purely acoustic sound generators. Pauline Oliveros and Sari Dienes' "Bottles and Bones" is here -- or at least a sketch thereof -- as is Jim Hobart's "Buick (Hubcap Harp) 1980," a very picturesque plucked lute with a resonator that is a hubcap.

"Sound/Art: Living Presences" is Don Goddard's short introductory essay. It looks at the integration of sound with visual art from a broad historical and then a contemporary perspective, then bows to the work at hand with a few thoughtful sentences on each of the artists in the show.

(continued from page 12)

with convincing names for new instruments, and secretly envious. Just for the heck of it, in closing, here are a few contemporary instrument names that I really like:

Arthur Frick's Beepmobile,
Ivor Darreg's Hobnailed Newellpost,
Tom Nunn's Wavicle Board,
Logos Foundation's Pneumafoons,
John Gibbon's Bell Garden,
Harry Partch's Quadrangularis Reversum,
Mbira Bass Dyad, Uba Goobi,
Marimba Eroica, Surrogate Kithara,
and, lest we forget where we started,
Spoils of War.

INSTRUMENTS

KITCHEN BANDS

Is it my imagination, or has there been an upsurge in the number of kitchen bands around lately?

I am a little unsure how to approach this subject, because I don't know whether the kitchen bands I have heard about are isolated happenings, or part of an ongoing tradition. Do most people know what a kitchen band is? Is the term widely known and used? Is kitchen band music an established and respected American music tradition, or is it more an occasional, impromptu eruption occurring in unconnected kitchens across the land?

I don't know, but here's a short report on some kitchen band music practitioners. The information is gathered from news reports from around the country. All of the groups below play old-time popular music using household utensils as instruments. All are peopled primarily by seniors, and all emphasize having a good time as the most important element in their music making.

THE MAPLE MANOR CUTIES is a group of eleven

women from Canton, IL. They play kazoos, washboards, wooden spoons, a rubber bucket, kettle lids and graters, and sing. Their repertoire features songs like "Harvest Moon," "Alley Cat," and "Turkey in the Straw." They have turned down engagements at various clubs, preferring to perform at their own and other senior centers.

THE JOLLY DOZEN BAND of Spring Valley, MN uses an ice cream bucket drum, pie pan cymbals, soap bottle kazoo, coffee can drums, spoons and lots of etcetera. They perform in senior centers and nursing homes, and at parades.

The thirteen members of SHEARER'S KITCHEN BAND, from Grand Forks, MI, play songs like "Blue Skirt Waltz," "Red Wing," and "The Yellow Rose of Texas," using washtubs, washboards and kitchen percussion, at senior centers in their area.

THE WOMEN'S CLUB OF HAWTHORNE RHYTHM MAKERS is a 20-member group from Hawthorne, CA. They specialize in altered kazoos (enhanced with funnels, lengths of hose, coffeepots and tin cans), augmented by meat cleaver and rake, washtub basses and additional kitchen percussion. They perform primarily in hospitals and convalescent homes.

ORGANIZATIONS AND PERIODICALS

In each issue, Experimental Musical Instruments reports on an organization or periodical that is of potential interest to our readers. If you are part of or know of an organization that deserves mention, please send us information.

THE GALPIN SOCIETY

The Galpin Society is a scholarly organization devoted to the study of musical instruments. It was founded in England in 1946, the first organization of its kind, preceding the American Musical Instrument Society (discussed in this column in EMI's August 1985 issue) by twenty-five years. Both groups approach the subject culturally (rather than acoustically), and both are oriented primarily but not exclusively to historical European instruments -- the Galpin Society more so than AMIS. The Galpin Society's main activity is the production of its annual journal, devoted to "the publication of research into the history, construction and use of musical instruments."

If you look over the listings of present and past officers in the Galpin Society, you will find the names of a great many prominent organologists and musicologists. Among the founding members of the society were Anthony Baines and Mrs. Arnold Dolmetsch; the first editor of the journal was Thurston Dart. Baines remains a vice-president of the society. The organization was dedicated at its founding to Canon Francis W. Galpin, one of the pioneering instrument collectors and researchers, and something of an organologist before there was really such a thing as an organologist. The current president of the society is Philip Bate, and Maurice Byrne is the journal's current editor.

The Galpin Society Journal runs to between 140 and 180 pages. For many years it was the only publication doing what it did, and a great deal of important organological scholarship has appeared in its pages, although much of it might seem academic and dry. A sampling of the articles in the last issue includes: "The Berkswell Cello" (a study of a now-decrepit 18th century cello), "J.C. Bach and the Bassett-Horn" (arguing that certain works thought to be written for Clarinet d'Amour were actually for Bassett-Horn), "Bent Plates in Violin Construction" (a historical, not acoustical, study), and "Clarinet Fingering Charts 1732-1816." It also includes "Notes and Queries," containing discussions and repartee on several current organological questions, and book reviews, mostly of scholarly works in various languages.

For people interested in joining the Galpin Society, the journal, in its quaintly formal language, advises that

"Applications for membership should be made in the first instance to the Hon. Secretary, from whom application forms can be obtained."

The Hon. Secretary's address is:

Pauline Holden
38 Eastfield Rd.
Western Park, Leicester
England, LE3 6FE

Annual membership is 10 pounds for UK residents; 12 pounds elsewhere.

Back issues of the journal can be obtained from the society, and are also widely available in libraries.

NOTICES

A REMINDER -- The North American Conference on Micro-Intervalic Music, sponsored by the Interval Foundation of San Diego, will be taking place in Cuernavaca, Mexico, July 12-19, 1986. There will be workshops, concerts, and some fascinating field trips, for the exploration of new scales and instruments. For more information write Interval Foundation, P.O. Box 8027, San Diego, CA 92102.

Jonathan Glasier of Interval Foundation will be doing a weekend "Shaman Sharing" in the mountains at Julia, CA on June 20-22 to raise money for the Conference of Micro-Intervalic Music (see above). Plenty of unusual and ethnic instruments will be used. For information write Interval Foundation, P.O. Box 8027, San Diego, CA 92102.

Pierre-Jean Croset, builder of extraordinary instruments including the Lyra featured in EMI Vol. I #1, is producing a digital recording of his music for the Ocora label. It will be distributed worldwide by Harmonia Mundi in CD or conventional disk, beginning in April or May of this year.

The Music Exchange Show of Used and Unusual Instruments will be held on Sunday, May 18th, 1986, at the Skyline Motor Inn, 10th Ave. and 49th St., New York City. Many of the dealers at the last show emphasized basses and guitars, but the organizers are happy to report that everything from accordions to zithers, with a lot of unusual items in between, were available to be bought, sold, traded and ogled.

The 1986 Convention of the Society of Folk Harpers and Craftsmen will take place June 28-July 1, 1986 at the University of Southern California, Los Angeles, CA, and exhibit space is available for instrument builders. For more information write

Lee Yoder, 1444 Calle Place, Escondido, CA 92027. Immediately preceding, at the same location, will be the convention of the American Harp Society; for information regarding exhibiting there, contact Glenda Griffin, 1586 Wedgewood Way, Upland, CA 91786.

The 15th annual meeting of the American Musical Instrument Society will be held May 8-11 at the University of South Dakota, in Vermillion, at the newly-renovated Shrine to Music Museum. Several papers will be read, and there will be concerts on a variety of period instruments.

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NEW MUSIC AMERICA 1986

New Music America 1986 will be taking place April 5-13 in Houston. A great deal more will be going on than we can mention here, but EMI's readers should know that there will be many concerts employing exceptional sound sources, including several by builders whose work has appeared in EMI, as well as a slew of permanent sound installations set up at various sites around the city. For information contact Diverse Works, Inc.: Official Festival Headquarters and Information Center, 214 Travis, Houston, TX; (713) 223-9410.

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RECENT ARTICLES APPEARING IN OTHER PERIODICALS

Listed below are selected articles of potential interest to readers of Experimental Musical Instruments which have appeared elsewhere recently.

ARTHEA, in **Musicworks** 33, Winter 1985-86 (1087 Queen St. West, Toronto, Canada, M6J 1H3).

Arthea is "a French group dedicated to the research and development of new instruments". The article includes two very intriguing photos of instruments with brief descriptions, and some philosophical meanderings.

INVITATIONS by Andrew Culver, also in **Musicworks** 33 (see above).

Primarily concerned with something called Tensegrity Sound Source #5, which is an instrument comprised of steel strings under tension and rigid metal members under compression. There is a photograph and some dense but informative descriptive notes on the instrument, along with other material in a philosophical-poetical vein. Recordings of the instrument may be heard on the tape that accompanies the journal.

ART ON THE RANGE by Linda Frye Burnham, in **Art-space** Vol. 10 #1, Winter 1985-86 (2227 Lead SE, Albuquerque, NM 87106).

Describes the work of two Montana rancher-artists. One of them, Patrick Zentz, has built some environmentally-activated musical instruments, such as dulcimers, pipes and drums activated directly or indirectly by wind and water.

MARCI A MIKULAK/IMPROVISATION: THE APPROPRIATE GESTURE by Michelle Miller, also in **Art-space** Vol. 10 #1 (see above).

Mikulak is a pianist and sculptor who has built a number of instruments. This article looks at her recent work in many areas. A photo of a string instrument with separate, disk-like resonators, is included. It can be heard on a "sound-sheet" (floppy vinyl record -- but the fidelity ain't bad) bound into the magazine.

CHRYSATLOPHONE, in **Interval** Vol. V #1, Fall-Winter 1986 (P.O. Box 8027, San Diego, CA 92102).

A photograph and brief description of an instrument made up of Brazilian "seed" crystals

mounted xylophone-style to produce an "incredibly pure" sound. Unfortunately, the information is incomplete and the maker is not identified.

ROBERT WILHITE: GYRO/CONE, in **Artweek** Vol. 17 #5 (1628 Telegraph Ave., Oakland, CA 94612)

A photograph and description of a recent outdoor sculpture erected by Wilhite in Los Angeles. "The cone generates its own sounds in response to those produced in its environment."

DAVID MOSS by Janet Heit, in **High Performance** #32 (240 S. Broadway, 5th Fl, Los Angeles, CA 90012).

A quick review of David Moss's performance style and recent work. Moss is noted for his ability to produce music with every imaginable product and by-product of our civilization.

A PNEUMATIC MUSIC: THE LINGUOFARINCAMPANOLOGIA by Llorenç Barber, in **Ear** Vol. 10 #3, Jan-Feb-Mar 1986 (325 Spring St. Rm. 208, New York, NY 10013).

Some comments on a system of sound production, and performance medium, which uses a metal bell resonating in close conjunction with the voice; from the man who developed the technique.

VOCAL IMAGING: BETTY BEAUMONT'S SONIC GATEWAY PROJECT by Emily Ruben, also in **Ear** Vol. 10 #3 (see above).

Describes plans for a "wind-intoned instrument that will produce an international phonetic 'language'." At each of several sites, wind will be channelled through a granite breakwater to instruments fashioned to replicate vocal sounds.

THE AMATEUR SCIENTIST by Jearl Walker, in **Scientific American** July 1984 (415 Madison Ave., New York, NY 10017).

Describes experiments performed by the author and a colleague on the acoustic behavior of bells, and in doing so provides some solid background on harmonic and non-harmonic overtone patterns.

CUERNAVACA! NORTH AMERICAN CONFERENCE OF MICRO-INTERVALIC MUSIC, also in **Interval** (see above).

Discusses plans for the festival set for July 1986, and includes photos and discussions of some instruments built by the slated participants.

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To:

